

App. No. 10/693,283
Office Action Dated June 3, 2005

Amendments to the Claims:

This Listing of Claims will replace all prior versions and listing of claims in the application. No new matter has been added.

Listing of Claims:

1-11 (Canceled)

12. (Currently Amended) A method for manufacturing a magnetoresistive element,
the magnetoresistive element comprising a substrate and a multi-layer film formed on the substrate, the multi-layer film comprising a pair of ferromagnetic layers and a non-magnetic layer sandwiched between the pair of ferromagnetic layers, wherein a resistance value depends on a relative angle formed by magnetization directions of the pair of ferromagnetic layers,
the method comprising:
(a) forming a part of the multi-layer film other than the ferromagnetic layers and the non-magnetic layer on the substrate as an underlying film;
(b) heat-treating the underlying film at 400°C or more;
(c) decreasing roughness of a surface of the underlying film by irradiating the surface with an ion beam;
(d) forming the remaining part of the multi-layer film including the ferromagnetic layers and the non-magnetic layer on the surface; and
(e) heat-treating the substrate and the multi-layer film at 330°C or more;
wherein the steps are carried out in the above order from (a) to (e).

13. (Original) The method according to claim 12, wherein the surface of the underlying film is irradiated with the ion beam so that an angle of incidence of the ion beam at the surface is 5° to 25°.

14. (Original) The method according to claim 12, wherein a lower electrode and an upper electrode are formed as a portion of the multi-layer film, and the lower electrode is included in the underlying film.